WHAT IS CLAIMED IS:

1. A method of evaluating a plurality of at least six solids or mixtures of solids to determine at least one surface property of the solids or mixtures of solids, the method comprising:

   a) supporting the plurality of solids or mixtures of solids on at least one support;

   b) contacting the plurality of solids or mixtures of solids with an adsorbate and measuring the radiation emitted, absorbed, or altered by each of the respective solids or mixtures of solids using a detector; and

   c) determining at least one surface property of each of the solids or mixtures of solids using the radiation measurements.

2. The method of Claim 1 wherein the radiation and detector are those used in a technique selected from the group consisting of infrared spectroscopy, ultraviolet spectroscopy, visible spectroscopy, fluorescence, infrared thermography, nuclear magnetic resonance, electron paramagnetic resonance, x-ray adsorption, x-ray photoelectron spectroscopy, Raman spectroscopy, and combinations thereof.

3. The method of Claim 1 further comprising identifying the solids or mixtures of solids having the value, relative or absolute, of the surface property that are closest to a predetermined value.

4. The method of Claim 1 wherein the surface property is selected from the group consisting of relative adsorptivity, acid site distribution, acid site energy or acid site strength, acid site strength distribution, base site strength, number of base sites, base site distribution, porosity, pore size, pore density, pore volume, pore shape, surface area, metal dispersion, exposed metal surface area, mobility of metals on the surface of a solid, chemisorb properties, physisorb properties,

adsorption selectivity, desorption, ion-exchange capacity, and combinations thereof.

5. The method of Claim 1 further comprising contacting the plurality of solids or mixtures of solids with a stream of inert fluid prior to the contacting with an adsorbate.

6. The method of Claim 5 further comprising measuring the radiation emitted, absorbed, or altered by the respective solids or mixtures of solids using the detector during the contacting of the plurality of solids or mixtures of solids with a stream of inert fluid to generate a baseline.

7. The method of Claim 1 further comprising correcting the measurements collected during the contacting with an adsorbate by subtracting a baseline.

8. The method of Claim 1 further comprising ramping the temperature of the plurality of solids or mixtures of solids to a predetermined maximum temperature while contacting the plurality of solids or mixtures of solids with a stream of inert fluid prior to contacting with an adsorbate.

9. The method of Claim 8 further comprising measuring the radiation emitted, absorbed, or altered by the respective solids or mixtures of solids using the detector during the contacting of the plurality of solids or mixtures of solids with a stream of inert fluid in order to generate a baseline.

10. The method of Claim 9 further comprising correcting the measurement obtained for each of the solids or mixtures of solids measured during contacting with an adsorbate by subtracting the baseline of Claim 9.

11. The method of Claim 1 wherein the solids or mixtures of solids are selected from the group consisting of inorganic solids and organic solids.

12. The method of Claim 1 wherein the solids or mixtures of solids are selected from the group consisting of catalysts, adsorbents, polymers, ceramics, metals, and various types of carbons.

13. The method of Claim 1 wherein the solids or mixtures of solids are selected from the group consisting of molecular sieves including zeolites, aluminas, silicas, amorphous silica aluminas, zirconias, mixed metal oxides, clays, ion exchange resins, and polymers.

14. The method of Claim 1 wherein the support comprises a plurality of wells.

15. The method of Claim 1 wherein the adsorbate is contacted with the plurality of solids or mixtures of solids in a mode selected from the group consisting of continuous contact or pulsed contact.

16. The method of Claim 1 wherein the adsorbate is selected from the group consisting of water, pyridine, ammonia, hydrogen, nitrogen, air, helium, argon, fluorine, neon, alkanes, alkynes, alkenes, alcohols, aromatics, thiols, esters, ketones, aldehydes, esters, amides, nitriles, nitroalkanes, amines, alkylamines, quinoline, carbon monoxide, carbon dioxide, and carboxylic acids.

17. The method of Claim 1 further characterized in that the contacting the plurality of solids or mixtures of solids is carried out by sequential contact with two or more adsorbates of different sizes with concurrent measurement of the radiation emitted, absorbed, or altered by each of the respective solids or mixtures of solids upon contact with each of the adsorbates using the detector.

18. The method of Claim 17 further comprising desorbing adsorbed adsorbate between each sequentially contacted adsorbate.

19. The method of Claim 1 further comprising predicting the behavior of a solid or mixture of solids based upon the surface property determined.

20. The method of Claim 1 wherein the plurality of solids or mixtures of solids contains at least twelve solids or at least twelve mixtures of solids.